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Abstract

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Grant Number: 1R29GM054909-01

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PI Title:

Project Title: SILACYCLOPROPANES--BUILDING BLOCKS FOR ORGANIC SYNTHESIS

Abstract: DESCRIPTION: The principal investigator notes that although the fundamental chemistry of silacyclopropanes has been explored, these compounds have not been utilized in organic synthesis. He reports that preliminary data suggest that these strained-ring silanes are useful building blocks for the construction of polyoxygenated organic compounds. It is stated that the silacyclopropane acts as a masked 1,3-diol, and new carbon-carbon bonds are formed with high stereoselectivity (greater than 98 percent). The principal investigator indicates that the proposal details methods for the construction of propionate (and dipropionate) units terminated by an acetaldehyde unit and that this architectural feature, which can be difficult to install if it possesses anti stereochemistry, is shared by many therapeutically important compounds, such as amphotericin B and nystatin A1, representatives of the polyene macrolide antibiotics. It is noted that these compounds are the most effective drugs for combating systemic fungal infections, which occur in immuno-compromised patients undergoing cancer chemotherapy and transplants, as well as AIDS patients and that new methods which facilitate the preparation of the polyene macrolides and their analogs for conducting structure-activity studies are important to the progress of the health sciences. The principal investigator states that in particular, the following will be demonstrated: (1) the insertion of formamides into silacyclopropanes will lead to new methods for the synthesis of polyoxygenated compounds, culminating in the total synthesis of stegobiol, the sex pheromone of a pest responsible for the destruction of stored grain; (2) metal-catalyzed reactions such as silylene transfer reactions will provide new syntheses of silacyclopropanes, and metal-catalyzed insertion reactions will generate useful polyol substructures; (3) silacyclopropanes with aromatic substituents on the silicon atom will be investigated to determine their reactivity; and (4) the generality of a modified oxidation of silanes to alcohols will be determined.

Thesaurus Terms:

chemical structure function, chemical synthesis, cyclopropane, method development, organic chemical, oxygen compound, silane alcohol, chemical transfer reaction, formamide, metal complex, oxidation, oxidation

reduction reaction, pheromone, polymer, silicon, stereochemistry

Institution: UNIVERSITY OF CALIFORNIA IRVINE
IRVINE, CA 92717

Fiscal Year: 1996

Department: CHEMISTRY

Project Start: 01-JUL-1996

Project End: 30-JUN-2001

ICD: NATIONAL INSTITUTE OF GENERAL MEDICAL SCIENCES

IRG: MCHA

